

Catalyst Measurement

version 2014-09-123

Color Coding Legend

Data Entry Cell	Calculated Cell	Acceptable Percent Difference Calculation	Instrument Calibration Out of Range
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Daily Calibration Results

Engine Family FHALX123A4V
 VIN/Serial No. L97AEJLD2FZ004672
 Task Directive TD2, Opt 2
 Entry Number ES3-2090853-7
 Inspection Number 20150701-0945-01
 Catalyst Inspection Date 7/1/2015
 Certificate Catalyst Manufacturer Zhongqi Exhaust Gas Purifier Co., Ltd.
 Certificate Catalyst Part Number ZLATV-0198.4.01
 Observed Catalyst Markings NONE

Instrument Used Starrett calipers (SN: 04231713)
 Date of Last Simco Calibration 5/8/2015

End Rod Result	Accuracy (mm)
25 mm End Rod	24.98
50 mm End Rod	50.01
75 mm End Rod	74.99

	1st Measured Value (mm)	2nd Measured Value (mm)	3rd Measured Value (mm)	4th Measured Value (mm)	Calculated Average Value (mm)	Percent Difference	Certificate Values
Diameter: outside of exhaust piping	35.12	35.14	35.07	35.13	35.12		
Diameter: outside of catalyst casing	Not measured	Not measured	Not measured	Not measured	--	--	See comments
Diameter: inside of catalyst casing (catalyst diameter)	32.44	32.57	32.44	32.46	32.48	--	See comments
Length: exhaust piping	70.63	70.59	70.67	70.67	70.69		
Length: catalyst casing	Not measured	Not measured	Not measured	Not measured	--	--	See comments
Length: catalyst material	Not measured directly	Not measured directly	Not measured directly	Not measured directly	59.84	--	See comments
Inset: catalyst casing (side 1)	Not measured	Not measured	Not measured	Not measured	--		
Inset: catalyst casing (side 2)	Not measured	Not measured	Not measured	Not measured	--		
Inset: catalyst substrate (side 1)	2.25	2.36	2.35	2.30	2.32		
Inset: catalyst substrate (side 2)	8.72	8.70	8.74	8.77	8.73		
Counted cells (total)	128				49.41	--	Not reported
Avgas inside diameter of casing (in)	1.28				99.68		
PAIR Observed? (Y/N)	Y						
PAIR Photo Name	DSCN0795.JPG						

Estimated Surface Area of Honeycomb Catalyst

Units	Calc from Measured Values	Calc from Cert Values	Percent Difference
sq. mm	79,676	--	--
sq. in	123.5	--	--

	Calc from Measured Values	Calc from Cert Values
Area of Honeycomb Face (sq. mm)	828	
Area of One Cell (sq. mm)	6.47	
Radius of Semi-Circle	2.03	
cells/mm ²		

Comments The cert. app reports dimensions of [REDACTED] but does not clearly state whether it is for the catalyst casing or substrate.

Areas of Concern All measured values are within [REDACTED] of the certified dimensions.

Photo Used for Counts DSCN8022 - Cell Count.JPG

Inspector: [REDACTED]
 Report Date: 7/2/2015

Catalyst Precious Metals Analysis

version 2014-10-20

Engine Family	PMAX 1234AV	Instrument Used	X-5000 (S/N: 202212)
VIN/Serial No.	L97AEU.D2F2004E72	Calibration Curve Name	Mobile Curve 2015-01-18
Task Directive	TD2_OH 2		
Entry Number	653-209853-1		
Inspection Number	2015070245-02		
Catalyst Inspection Date	7/2/2015		
Certificate Catalyst Manufacturer	Zhongguo Ethanol Gas Purifier Co., Ltd.		
Certificate Catalyst Part Number	ZLX1V410B 4.01		
Observed Catalyst Markings	NONE		
Catalyst Type (Hexapenta or mesh)	Hexapenta		

Measured Metal Ratios			
Measured Value (by concentration, by weight)	Measured Value (ppm)	Calculated Ratio from Measurement	
Pt	0.021	209	4.4
Pd	0.258	2579	55.8
Rh	0.005	48	1.0
Ce	8.530	85300	
Zr	0.335	3354	

Certified Metal Ratios			
Reported Cert Loading Value	Units	Calculated Loading Value (g/L)	Ratio
Pt	g/m ³	0.0000	NA
Pd	g/m ³	1.4128	NA
Rh	g/m ³	0.0000	NA
Total	g/m ³	1.4128	

Value to compare against measured	Reported Cert Ratio	Ratio Percent Difference (%)
Pt		
Pd		
Rh		

Loading Determination

Sample Extraction Method: Dried holes
Weight of Extracted Powder (g): 1.09

Manually Extracted Volume (for loadings)			
Hole #	Unit Bit Diameter (inches)	Hole Length/Depth (mm)	Hole Volume (mm ³)
Hole 1	1/164	59.84	2.192
Hole 2	1/164	59.84	2.192
Hole 3	1/164	59.84	2.192
Total Volume of Extraction Holes:			0.004285

Extracted			
Washed Powder Weight (g)	Calculated Metals Loading (g/L)	Cert Value - Loading Difference (%)	Loadings Percent
Pt	0.00023	0.053	
Pd	0.00292	0.885	
Rh	0.00055	0.012	
Total	0.00320	0.7541	

Test Conditions: 3 runs, 80 seconds each

Check Standards: The measured concentrations of all precious metals for all pre- and post-inspection check standards were within their maximum allowable ranges

The calculated ratio was Pt: Pd: Rh was 4.4: 55.8: 1 and the reported certified ratio was 4.4: 55.8: 1.0. The calculated ratio was within the certified value.

Related Photos: DSCN0025.JPG - DSCN0026.JPG

Inspector(s):
Report Date: 7/2/2015

Daily Calibration Results (Pre-Inspection)			
Check Standard ID	Measured Value (ppm)	NEIC Value (ppm)	Maximum Percent Difference (%)
Pt 00026	8578	9410	11.87%
Pd 01335	113	144	47.50%
Rh 1145-1	613	697	13.23%
Daily Calibration Results (Post-Inspection)			
Check Standard # ID	Measured Value (ppm)	NEIC Value (ppm)	Maximum Percent Difference (%)
Pt 00026	9775	9410	11.87%
Pd 01335	108	144	47.30%
Rh 1145-1	824	697	13.23%
Percent Difference			
Call Status	Comments		
OKAY			
OKAY			
OKAY			